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Pesticide Fact Sheet Number 108: Aldrin

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Pesticide Fact Sheet

Name of Chemical: ALDRIN

Reason for Issuance: REGISTRATION STANDARD

Date Issued: DECEMBER, 1986

Fact Sheet Number: 108

1. DESCRIPTION OF CHEMICAL

Generic Name: 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-exo-1,4-endo-5,8-dimethanonaphthalene.

Common Name: Aldrin

Trade and Other Names: Aldrine, HHDN, Aldrex®, Aldrex 30®, Aldrite®, Aldrosol®, Alttox, Bangald®, Drinox®, Octalene®, Rasayaldrin®, Seedrin® Liquid, Entoma 15949 and Compound 118.

EPA Shaughnessy Code: 045101

Chemical Abstracts Service (CAS) Number: 309-00-2

Year of Initial Registration: 1949

Pesticide Type: Insecticide

Chemical Family: chlorinated cyclodiene

U.S. and Foreign Producers: Shell International Corp.

2. USE PATTERNS AND FORMULATIONS

Application Sites: soil surrounding wooden structures for termite control

Types of Formulations: 2 and 4 lb/gal emulsifiable concentrates

Types and Methods of Application: trenching, rodding, subslab injection, low pressure spray

Application Rates: 0.25 to 0.5% emulsion

3. SCIENCE FINDINGS

Summary Science Statement

Aldrin is a chlorinated cyclodiene with high acute toxicity.

The chemical has demonstrated adverse chronic effects in mice (causing liver tumors). Aldrin may pose a significant health risk of chronic liver effects to occupants of structures treated with aldrin. The Agency is continuing to evaluate the potential risk from the termiticide use of aldrin to determine whether further regulatory action may be warranted. Aldrin is extremely toxic to aquatic organisms and birds. Aldrin is persistent and bioaccumulates. Aldrin may have a potential for contaminating surface water; thus, a special study is required to delineate this potential. Applicator exposure studies are required to determine whether exposure to applicators may be posing health risks. Special subacute inhalation testing is required to evaluate the respiratory hazards to humans in structures treated with aldrin. Data available to the Agency show a pattern of misuse and misapplication of aldrin. The Agency is requiring restricted use classification of all end-use products containing aldrin. Application must be made either in the actual physical presence of the Certified Applicator, or if the Certified Applicator is not physically present at the site, each uncertified applicator must have completed a State approved training course and be registered in the State in which the uncertified applicator is working.

Chemical Characteristics of the Technical Material

Physical State: Crystalline solid

Color: Tan to dark brown

Odor: Mild chemical odor

Molecular weight and formula: 364.93 - $C_{12}H_8Cl_6$

Melting Point: 104 to 104.5 °C

Boiling Point: Decomposes at 1 atm.

Vapor Pressure: 6.6×10^{-6} mmHg at 25 °C

Solubility in various solvents: Very soluble in most organic solvents; practically insoluble in water

Stability: Stable with alkali and alkaline-oxidizing agents; not stable with concentrated mineral acids; acid catalysts, acid-oxidizing agents, phenols, active metals

Toxicology Characteristics

Acute Oral: Data gap

Acute Dermal: Data gap

Primary Dermal Irritation: Data gap

Primary Eye Irritation: Data gap

Skin Sensitization: not a sensitizer

Acute Inhalation: Data gap

Major routes of exposure: Inhalation exposure to occupants of treated structures; dermal and respiratory exposure to termiticide applicators.

Delayed neurotoxicity: does not cause delayed neurotoxic effects.

Oncogenicity: This chemical is classified as a Group B₂ (probable human oncogen). Rat oncogenicity study is a data gap. There are three long-term carcinogenesis bioassays of aldrin in mice which were independently conducted by investigators affiliated with the National Cancer Institute

and the Food and Drug Administration. These studies were found to produce significant tumor responses in three different strains of mice (C₃H, CF₁, and B6C3F₁) in males and females with a dose-related increase in the proportion of tumors that were malignant.

Available data from seven existing carcinogenesis bioassays in rats are inadequate and inconclusive and a well-designed study in rats is needed to determine the carcinogenic potential of aldrin in this species.

Chronic Feeding: Based on a rat chronic feeding study, a Lowest Effect Level (LEL) of 0.025 mg/kg/day has been calculated.

Metabolism: In biological systems, aldrin is readily epoxidized to dieldrin.

Teratogenicity: Data gap

Reproduction: Data gap

Mutagenicity: Aldrin does not possess mutagenic activity in bacteria. Further testing is required to assess the mutagenic potential of aldrin in eukaryotes.

Physiological and Biochemical Characteristics

The precise mode of action in biological systems is not known. In humans, signs of acute intoxication are primarily related to the central nervous system (CNS), including hyperexcitability, convulsions, depression and death.

Environmental Characteristics

Available data are insufficient to fully assess the environmental fate of aldrin. Data gaps exist for all applicable studies. However, available supplementary data indicate general trends of aldrin behavior in the environment. Aldrin degrades readily to dieldrin, which is persistent in the

environment. Reports on leaching and field studies suggest that aldrin/dieldrin would be unlikely to leach to underground aquifers. However, additional data are necessary to assess the potential for ground-water contamination as a result of the termiticide use of aldrin.

Ecological Characteristics

Avian oral toxicity: 6.59 mg/kg in bobwhite quail; 52 mg/kg in mallard ducks.

Avian dietary toxicity: 34 and 155 ppm in Japanese quail and mallard duck, respectively.

Freshwater fish acute toxicity: 5 and 53 ppb in largemouth bass and channel catfish, respectively (warmwater species), 2.6 and 8.2 ppb in rainbow trout and chinook salmon, respectively (coldwater species).

Freshwater invertebrate toxicity: 18 ppb in a species of seed shrimp; 32 ppb in a species of water flea.

4. Required Unique Labeling and Regulatory Position Summary

° EPA is currently evaluating the potential human health risks of 1) non-oncogenic chronic liver effects, and 2) oncogenic effects from exposure to aldrin. Following the completion of Registration Standards on alternative chlorinated cyclodiene termiticides (chlordan and heptachlor) EPA will determine whether the risks posed by the termiticide use of aldrin warrant further regulatory action.

° In order to meet the statutory standard for continued registration, retail sale and use of all end-use products containing Aldrin must be restricted to Certified Applicators or persons under their direct supervision. For purposes of Aldrin use, direct supervision by a Certified Applicator means 1) the actual physical presence of a Certified Applicator at the application site during application, or 2) if the Certified Applicator is not physically present at the site, each uncertified applicator must have completed a State approved training course and be registered in the State in which the uncertified applicator is working; the Certified Applicator must be available if and when needed.

° In order to meet the statutory standard for continued registration, Aldrin product labels must be revised to provide specific Aldrin disposal procedures, and to provide fish and wildlife toxicity warnings.

- ° The Agency is requiring a special monitoring study to evaluate whether and to what extent surface water contamination may be resulting from the use of Aldrin as a termiticide.

- ° Special product-specific subacute inhalation testing is required to evaluate the respiratory hazards to humans in structures treated with termiticide products containing Aldrin.

- ° The Agency is requiring the submission of applicator exposure data from dermal and respiratory routes of exposure.

- ° While data gaps are being filled, currently registered manufacturing use products and end use products containing Aldrin may be sold, distributed, formulated, and used, subject to the terms and conditions specified in the Registration Standard for Aldrin. Registrants must provide or agree to develop additional data in order to maintain existing registrations.

5. TOLERANCE REASSESSMENT

No tolerance reassessment for Aldrin is necessary since there are no food or feed uses.

6. SUMMARY OF MAJOR DATA GAPS

- ° Hydrolysis
- ° Photodegradation in Water
- ° Aerobic Soil Metabolism
- ° Anaerobic Soil Metabolism
- ° Leaching and Adsorption/Desorption
- ° Aerobic Aquatic Metabolism
- ° Soil Dissipation
- ° Reproductive Effects in Rats
- ° Rat Oncogenicity Study
- ° Mutagenicity Studies
- ° Teratology Studies
- ° Battery of Acute Toxicity Studies
- ° Special Surface Water Monitoring Studies
- ° Applicator Exposure Studies
- ° Special Guinea Pig Inhalation Study

- All Product Chemistry Studies

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